UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/609,106	06/30/2000	Alyn Rockwood	MERL-1281	2574

7590   11/13/2003

Dirk Brinkman Esq
201 Broadway
Cambridge, MA 02139

EXAMINER
BRODA, SAMUEL

ART UNIT	PAPER NUMBER
2123	

DATE MAILED: 11/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the c rresp ndence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _30 June 2000 and 06 December 2000_.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-15_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-15_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _30 June 2000_ is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

    a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _4_.

4) ☐ Interview Summary (PTO-413) Paper No(s). _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: .

DETAILED ACTION

1.   Claims 1-15 have been examined, after the entering of a <u>Preliminary Amendment</u> mailed

on 6 December 2000.

Drawings

2.   The Draftsperson has objected to the drawings; see the copy of Form PTO-948 for an

explanation.

Specification

3.   A prior art search yielded a chapter of "Geometric Computing With Clifford Algebra:

Theoretical Foundations And Applications In Computer Vision And Robotics" titled

"Generalized Homogeneous Coordinates for Computational Geometry" (the "Chapter") that was

authored by Applicants. The Chapter was downloaded from:

http://modelingnts.la.asu.edu/html/AFCG.html, a website apparently operated by co-Applicant

Hestenes.

The Chapter appears to teach the use of conformal transformations to be applied to

objects as corresponding to that taught by the Specification; compare Table 2.2 at page 28 of the

Chapter to Fig. 4 of the Specification.

The Chapter also indicates at page 1 that "This work has been partially supported by NSF

Grant RED-9200442." It is unclear whether the U.S. Government retains license rights to this

Application; no such reference appears in the Specification. See MPEP Section 310.

For this reason, the Specification is objected to. Clarification from Applicants and/or

amendment to the Specification is required.

Claim Rejections - 35 U.S.C. § 112, First Paragraph

4.   The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4.1   Claims 1-15 are rejected under 35 U.S.C. 112, first paragraph, as containing

subject matter which was not described in the specification in such a way as to enable one skilled

in the art to which it pertains, or with which it is most nearly connected, to make and/or use the

invention.

4.2   Regarding independent claim 1, this claim includes the limitation "associating a

plurality of general homogeneous operators with each data construct to generate a model of the

object."

The text of the Specification that appears to most closely support this limitation appears

at page 6 lines 14-23, stating:

. . . The encoder 110 combines the homogeneous data and corresponding

homogeneous methods to generate classes that together for [sic] an object-

orientated programming structure (OOPS) 130.

The modeler 120 operates on the OOPS 130 using run-time parameters

121 to determine distances, intersections, and tangencies of the basic components,

and to perform operators such as rotations and displacements of the basic

components. In an object orientated programming structure, methods are applied

to data. Output of the modeler 120 can be rendered as images on a display device

109.

However, the Specification fails to provide any description regarding:

(1) the type of object-oriented programming structure used to model an object;

(2) the type and values of the "run-time parameters 121"; and

(3) the guidance describing how one of ordinary skill in the art would select such types and

values for run-time parameters.

Additionally, the Specification appears to lack flowcharts or other text describing the

steps necessary to program an encoder to generate an object-oriented programming structure and

to program a modeler to operate on the structure. See MPEP Section 2106.02; see especially

column 1 page 2100-27 (February 2003).

The Specification and accompanying figures do not appear to teach how one could make

and/or use the invention but instead appear to describe the benefits of such an invention. Taken

as a whole, only with undue experimentation could one reasonably skilled in the art make and/or

use the invention, because of the omissions in the subject matter described in the Specification.

4.3   Claims 2-15 are dependent on claim 1 and rejected using the same analysis.

Claim Rejections - 35 U.S.C. § 101

5.   The following is a quotation of 35 U.S.C. 101:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5.1   Method claims 1-15 are rejected for reciting a process that is not directed to the

technological arts.

5.2   Regarding claim 1, this claim is directed at a method for modeling an object

composed of one or more components. To be statutory, the utility of an invention must be within

the technological arts. *In re Musgrave*, 167 USPQ 280, 289-90 (CCPA, 1970). The definition of

"technology" is the "application of science and engineering to the development of machines and

procedures in order to enhance or improve human conditions, or at least to improve human

efficiency in some respect." (Computer Dictionary 384 (Microsoft Press, 2d ed. 1994)).

The limitations recited in claim 1 contain no language suggesting that claim 1 is intended

to be within the technological arts.

5.3   Claims 2-15 are dependent on claim 1 and rejected using the same analysis.

5.4 Method claims 1-15 are rejected for reciting a process comprising an abstract idea.

5.5 Regarding claim 1, this claim is directed to "a method for modeling an object composed of one or more components", and the steps recited in claim 1 describe the abstract idea of encoding data and associating the data with operators. These steps do not: (1) recite data gathering limitations or post-mathematical operations that might independently limit the claims beyond the performance of a mathematical operation; or (2) limit the use of the output to a practical application providing a useful, concrete, and tangible result, such as controlling the movement of a robot to avoid collision with an obstacle.

5.6 Claims 2-15 are dependent on claim 1 and rejected using the same analysis.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to Applicants' disclosure. Reference to Dorst, "Geometric (Clifford) Algebra: A Practical Tool for Efficient Geometrical Representation," Dept. of Computer Science, University of Amsterdam, pp. 1-41 (May 1999) (paper available at: http://carol.science.uva.nl/~leo/clifford/talknew.ps), is cited as teaching a review of mathematical concepts in geometric algebra.

Reference to Li, "Some Applications of Clifford Algebra to Geometries," Lecture Notes in Computer Science, Vol. 1669 / 1999, ISSN: 0302-9743, pp. 156-179 (1999), is cited as teaching an application of geometric algebra to a kinematic problem of a robot. See pages 173-174.

Reference to Bayro-Corrochano et al, "Object Modelling and Collision Avoidance Using Clifford Algebra," Lecture Notes in Computer Science, Vol. 970, pp. 699-706 (1995)(paper available at: http://citeseer.nj.nec.com/577987.html), is cited as teaching use of Clifford algebra to model collision avoidance using a trivector and forming a control equation. See pages 704-706.

Reference to Mourrain et al, "Applications of Clifford Algebras in Robotics," Computational Kinematics (Merlet and Ravani, Editors), pp. 41-50 (1995)(paper available at: http://citeseer.nj.nec.com/mourrain95application.html), is cited as teaching use of Clifford algebra to model the movement of a parallel robot.

Reference to Ravani et al, "Kinematic Localization for World Model Calibration in Off-Line Robot Programming Using Clifford Algebra," 1991 IEEE International Conference on Robotics and Automation, Vol. 1 pp. 584-589 (April 1991), is cited as teaching use of a Clifford algebra representation of kinematic relationships of multiple frames.

7.   Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Samuel Broda, whose telephone number is (703) 305-1026. The Examiner can normally be reached on Mondays through Fridays from 8:00 AM – 4:30 PM.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Kevin Teska, can be reached at (703) 305-9704. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the group receptionist, whose telephone number is (703) 305-3900.

SAMUEL BRODA, ESQ.
PRIMARY EXAMINER